IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF Faris et al.
Serial No. TBD
Filed: June 4, 2001
Group Art Unit: TBD
Title: METHOD FOR MANUFACTURING 3D IMAGE DISPLAY BODY AND FILM FOR USE IN FORMING 3D IMAGE DISPLAY BODY
Examiner: TBD
Attorney Docket VREX-0020USANO00

PETITION FOR RETROACTIVE LICENSE

(35 CFR 5.25)

Commissioner of Patents
(Attention Licensing & Review)
Washington DC 20231

06/08/2001 SZEWDIE1 00000013 501648 09873509
03 FC:122 130.00 CH

Honorable Sir:

This petition for a retroactive license is being filed for the above-identified application under 35 USC 184 and CFR 5.25.

A Japanese licensee on behalf of the inventors previously filed the material for the above application in Japan and Korea. The filing particulars are:

Japan Serial Number 11-168957 June 15, 1999

Japan Serial Number 2000-174888 June 7, 2000

Japan Laid open # 2001-59949 March 6, 2001

Korea Serial Number 10-2001-0002052 January 13, 2001

Copies of the 170758 Japanese application and a translation are attached. The material in the 1999 application is essentially the same.

DECLARATION

This is a declaration and averment that the subject matter was not under a secrecy order at the time it was filed abroad, and that it is not currently under secrecy order.

The undersigned learned of the existence of the Japanese applications on or about January 21, 2000 from two of the inventors, David Swift and Adam Divelbiss upon their return from visiting Arizawa Corporation in Japan. Arizawa Corporation is a licensee of certain micropolarizer technology from VRex Inc., the prospective assignee of the above-

identified application. I was informed at that time that the Japanese applications had been filed in June 2000. After some effort, I obtained Japanese versions of the application and had it translated into English. A copy of the original Japanese and the translation are enclosed.

In the process of preparing the above identified US application I learned from Mr. Takeshi Yoshii, the Japanese Patent Attorney that represents Arizawa of the 1999 Japanese filing and the Korean filing identified above. This is to aver that I nor any employee of VRex Inc. or Reveo Inc. (VRex's parent) had any knowledge of these filings until January 2001.

The Japanese inventors and the Arizawa Corporation first learned of the technology identified in these applications as the result of meetings in the United States at the headquarters of Reveo, Inc. That took place on or about April 1999. Despite regular contacts between Reveo and VRex employees with Arizawa employees, the US inventors and the assignee had no knowledge of the foreign filings prior to 2001.

The undersigned further avers that the Japanese and Korean filings without the knowledge of the US inventors, was an error on the part of the Japanese inventors and they were done without any deceptive intent by any of the parties. As outlined above, the US inventors had no knowledge of these filings prior to January of this year.

Please charge Deposit Account 501648 the fee under 37 CFR 1.17(h) ($130.00)

The undersigned respectfully submits that the there has been a showing of facts beyond a mere allegation of action through error and without deceptive intent.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued therein.

The applicants respectfully request that a Retroactive Foreign License be granted for the above-identified application.

Respectfully submitted,

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operation of ... environmental Improvement.

【書類名】　明細書　TAC + CAB — cover film only?

【発明の名称】　３Ｄ映像表示体の製造方法及び３Ｄ映像表示体形成用のフィルム

ADD: ① UV coat & peel off
② Dipping methods?

【特許請求の範囲】

【請求項１】　右目用映像表示部と左目用映像表示部とが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材上に接着剤を介して位相差フィルムを設け、続いて、該位相差フィルムの所定位置に透明なレジスト部材を設けた後、熱水に浸漬させ、乾燥後レジスト部材側に保護部材を設け、その後、該保護部材と表示部材とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法。

【請求項２】　右目用映像表示部と左目用映像表示部とが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材上に接着剤を介して複屈折性のないＴＡＣフィルムやＣＡＢフィルム等と位相差機能を有する延伸ＰＶＡフィルムとを積層した積層位相差フィルムをＴＡＣフィルム等が接着剤側となるように設け、続いて、延伸ＰＶＡフィルムの所定位置に透明なレジスト部材を設けた後、熱水に浸漬させ、乾燥後レジスト部材側に保護部材を設け、その後、該保護部材と表示部材とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法。

【請求項３】　右目用映像表示部と左目用映像表示部とが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材上に接着剤を介して複屈折性のないＴＡＣフィルムやＣＡＢフィルム等と位相差機能を有する延伸ＰＶＡフィルムとを積層した積層位相差フィルムをＴＡＣフィルム等が接着剤側となるように設け、続いて、延伸ＰＶＡフィルムの所定位置にレジスト部材を設けた後、熱水に浸漬させ、乾燥後レジスト部材間に適宜な部材を充填し且つこの適宜な部材及びレジスト部材側に保護部材を設け、その後、該保護部材と表示部材とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法。

【請求項４】　請求項２，３いずれか１項に記載の３Ｄ映像表示体の製造方法において、適宜な部材及び保護部材として、複屈折性を有しない部材を採用し

たことを特徴とする３Ｄ映像表示体の製造方法。

【請求項５】　右目用映像表示部と左目用映像表示部とが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体形成用のフィルムであって、透明な支持材上に接着剤を介してＴＡＣフィルム等の複屈折性を有しないフィルムと位相差機能を有する延伸ＰＶＡフィルムとを積層した積層位相差フィルムが該複屈折性を有しないフィルムが接着剤側となるように設けられており、この延伸ＰＶＡフィルムの所定位置には右目用映像表示部及び左目用映像表示部が設けられ、更にこの延伸ＰＶＡフィルムには透明なレジスト部材が設けられ、このレジスト部材上には保護部材が設けられていることを特徴とする３Ｄ映像表示体形成用のフィルム。

【請求項６】　請求項５記載の３Ｄ映像表示体形成用のフィルムにおいて、レジスト部材間には適宜な部材が充填されていることを特徴とする３Ｄ映像表示体形成用のフィルム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】

本発明は、３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法及び３Ｄ映像表示体形成用のフィルムに関するものである。

【０００２】

【従来の技術及び発明が解決しようとする課題】

従来から、例えばＵＳＰ５，３２７，２８５号に示すような３Ｄ映像装置が提案されている。この３Ｄ映像装置は図１に図示したように液晶部材５１の表面に右目用映像表示部ａと左目用映像表示部ｂとが交互に並設されたフィルム５２を貼り合わせたもので、該液晶部材５１の発光をコントロールして所定の映像を現出させる際、右目用映像表示部ａからは右目用映像を、また、左目用映像表示部ｂからは左目用映像を現出させるものである。そして、右目用映像表示部ａからの右目用映像を構成する偏光の振動方向は左目用表示部ｂからの左目用映像を構成する偏光の振動方向に対し９０°の角度を有する偏光となるように構成されている為（二成分ｘ，ｙから成る右目用映像の例えばｘ成分は、同様に二成分ｘ，ｙから成る左目用映像のｘ成分に対して１８０°（π）の位相差を有するように構

成されている為)、右目用映像のみを透過する偏光板付右目用レンズと左目用映像のみを透過する偏光板付左目用レンズとから成る偏光メガネで該映像を見ると、観察者は立体映像を観念し得ることになる。

【０００３】

ところで、前記右目用映像表示部ａ及び左目用映像表示部ｂが交互に並設されたフィルム５２の製造方法はこれまで前記ＵＳＰ５，３２７，２８５号のFig2に開示されているように、ＴＡＣフィルムとヨウ素処理した延伸ＰＶＡフィルムとを積層した偏光フィルムにフォトレジストをコートし、所定部分を露光後、水酸化カリウム溶液で処理して延伸ＰＶＡフィルムが有する特定の波長域の光の振動方向を直線偏光状態のまま回転し得る性質（位相差機能）を消失させるという方法で製造されている。しかし、この方法はフォトレジストのコート後、露光させ、更に、水酸化カリウム溶液で処理しなければならず、非常に煩雑な製造方法である。ＵＳＰ５，３２７，２８５号には上記のような化学的処理によりフィルム５２を製造する数種の方法、及び物理的処理によりフィルム５２を製造する方法等が開示されているが、いずれも同様に煩雑な製造方法である。

【０００４】

本発明は非常に簡易にして量産性に秀れた右目用映像表示部ａ及び左目用映像表示部ｂが混在するフィルム及びその製造方法を提供するものである。

【０００５】

【課題を解決するための手段】

添付図面を参照して本発明の要旨を説明する。

【０００６】

右目用映像表示部ａと左目用映像表示部ｂとが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材１上に接着剤２を介して位相差フィルムを設け、続いて、該位相差フィルムの所定位置に透明なレジスト部材４を設けた後、熱水に浸漬させ、乾燥後レジスト部材４側に保護部材９を設け、その後、該保護部材９と表示部材５とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法に係るものである。

【０００７】

また、右目用映像表示部ａと左目用映像表示部ｂとが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材１上に接着剤２を介して複屈折性のないＴＡＣフィルム６やＣＡＢフィルム等と位相差機能を有する延伸ＰＶＡフィルム７とを積層した積層位相差フィルム３をＴＡＣフィルム６等が接着剤２側となるように設け、続いて、延伸ＰＶＡフィルム７の所定位置に透明なレジスト部材４を設けた後、熱水に浸漬させ、乾燥後レジスト部材４側に保護部材９を設け、その後、該保護部材９と表示部材５とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法に係るものである。

【０００８】

また、右目用映像表示部ａと左目用映像表示部ｂとが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材１上に接着剤２を介して複屈折性のないＴＡＣフィルム６やＣＡＢフィルム等と位相差機能を有する延伸ＰＶＡフィルム７とを積層した積層位相差フィルム３をＴＡＣフィルム６等が接着剤２側となるように設け、続いて、延伸ＰＶＡフィルム７の所定位置にレジスト部材４を設けた後、熱水に浸漬させ、乾燥後レジスト部材４間に適宜な部材８を充填し且つこの適宜な部材８及びレジスト部材４側に保護部材９を設け、その後、該保護部材９と表示部材５とを重ね合わせ若しくは貼り合わせることを特徴とする３Ｄ映像表示体の製造方法に係るものである。

【０００９】

また、請求項２，３いずれか１項に記載の３Ｄ映像表示体の製造方法において、適宜な部材８及び保護部材９として、複屈折性を有しない部材を採用したことを特徴とする３Ｄ映像表示体の製造方法に係るものである。

【００１０】

また、右目用映像表示部ａと左目用映像表示部ｂとが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体形成用のフィルムであって、透明な支持材１上に接着剤２を介してＴＡＣフィルム６等の複屈折性を有しないフィルムと位相差機能を有する延伸ＰＶＡフィルム７とを積層した積層位相差フィルム３が該複屈折性を有しないフィルムが接着剤２側となるように設けられており、この延伸ＰＶＡフィルム７の所定位置には右目用映像表示部ａ及び左目用映像表示部ｂが設けられ

【発明の実施の態様】

図２は本発明の実施例を図示したもので、以下に詳述する。

【００１７】

透明な支持材１（例えば厚さ２mm程度のガラス板やセルロースアセテートプチレート（ＣＡＢ）板等）上に接着剤２（例えば紫外線硬化性樹脂）を介してＴＡＣフィルム６（厚さ１２６μm）と位相差機能を有する位相差フィルム（１／２波長板）としての一軸延伸ＰＶＡフィルム７（厚さ３８μm）とを積層した積層位相差フィルム３を設け、紫外線により紫外線硬化性樹脂を硬化させる。尚、支持材１は複屈折性を有しないガラス板が最も望ましい。また、積層位相差フィルム３は延伸ＰＶＡフィルム７にＴＡＣフィルム６を積層したものの他、延伸ＰＶＡフィルム７にＣＡＢフィルムを積層したもの等でもよく、要は延伸ＰＶＡフィルム７に複屈折性を有しないフィルムを積層したものであれば積層位相差フィルム３として採用し得る。

【００１８】

続いて、この一軸延伸ＰＶＡフィルム７の所定位置にレジスト部材４としての透明で耐水性が高く且つ密着性の高いレジストインク（例えばウレタン樹脂系接着剤）をスクリーン印刷により施す。この場合のレジストインクは、延伸ＰＶＡフィルム７の表面に一側から他側に向かって施される１６０μm幅の線状体であり、この線状体は１６０μmのピッチをおいて並設されている。

【００１９】

尚、レジストインクは上記のように等幅且つ等ピッチである必要はなく、また、線状体でなくても、例えば平面視正方形状体を千鳥状に配するようにしても良い。

【００２０】

続いて、これを８０°Ｃの熱水に約３０秒程度浸漬し（勿論周面には適宜な防水処理を施す。）、レジストインクが存在しない部分に水を浸透させることで延伸ＰＶＡフィルム７の分子の方向性を破壊し、延伸前の状態、即ち、延伸ＰＶＡフィルム７が元来有する前記位相差機能を消失させ、レジストインクが存在する部分を例えば右目用映像表示部ａとし、レジストインクが存在しない部分を左目用

、更にこの延伸ＰＶＡフィルム７には透明なレジスト部材４が設けられ、このレジスト部材４上には保護部材９が設けられていることを特徴とする３Ｄ映像表示体形成用のフィルムに係るものである。

【００１１】

また、請求項５記載の３Ｄ映像表示体形成用のフィルムにおいて、レジスト部材４間には適宜な部材８が充填されていることを特徴とする３Ｄ映像表示体形成用のフィルムに係るものである。

【００１２】

【発明の作用及び効果】

位相差フィルム上の所定位置に透明なレジスト部材４を設けた後、湯に浸漬させると、位相差フィルムのレジスト部材４の存在しない部分に水が浸透し、該部分が変質し、該部分のみ特定の波長域の光の振動方向を直線偏光状態のまま回転し得る性質（位相差機能）が消失し、レジスト部材４が存在する部分とレジスト部分４が存在しない部分とで透過光の位相が１８０°ずれるフィルムが得られることになる。

【００１３】

よって、単に熱水に浸漬させるという操作のみで右目用映像表示部ａ及び左目用映像表示部ｂが混在したフィルムを量産し得ることになる。

【００１４】

本発明は位相差フィルムの所定部分に熱水を浸透させるため、該部分は部分的に膨潤・溶出・凹凸界面の現出等が生じるおそれもあるが、この点、本発明は保護部材９が設けられているため、表示体全体としての耐湿熱性は向上し、また、前記位相差フィルムの膨潤等の問題も解決され、よって、それだけ信頼性が向上する。

【００１５】

さらに、レジスト部材４間に適宜な部材８が充填され、表面が平坦になるため、それだけ光の拡散が抑制され、解像度及びコントラストが向上することになる。

【００１６】

映像表示部ｂとする。尚、種々実験した結果、８０°Ｃ～１００°Ｃの熱水に５秒～１０分以内浸漬すれば、同様に上記延伸ＰＶＡフィルム７の性質が消失することを確認している。

【００２１】

続いて、レジストインク間にして延伸ＰＶＡフィルム７上に適宜な部材８としてＵＶ樹脂，ＰＶＡ系接着剤若しくはアクリル系粘着剤等を充填し、且つ保護部材９としてのＴＡＣ若しくはＣＡＢシートを積層する。尚、適宜な部材８及び保護部材９は位相の変化を生じさせないよう複屈折性を有しないものであればどのような部材でもよい。

【００２２】

続いて、内部に液晶が設けられた表示部材５とマグネット等で重ね合わせ若しくは適宜な接着剤により貼り合わせ、３Ｄ映像表示体とする。

【００２３】

レジストインクを施す位置、即ち、右目用映像表示部ａ及び左目用映像表示部ｂの位置は貼り合わせる表示部材５の液晶セルのピッチに合致するように設定する。

【００２４】

以上の製造方法により右目用映像表示部ａと左目用映像表示部ｂとが並設されたフィルムを簡易に得ることができ、よって、３Ｄ映像表示体も簡易に得ることが可能となる。

【００２５】

一般にＰＶＡは耐湿熱性が良好ではない。しかも、本実施例は延伸ＰＶＡフィルム７の所定部分に熱水を浸透させるため、該部分は部分的に膨潤・溶出・凹凸界面の現出等が生じるおそれもある。この点、本実施例は保護部材９が設けられているため、表示体全体としての耐湿熱性は向上し、また、前記延伸ＰＶＡフィルム７の膨潤等の問題も解決され、よって、それだけ信頼性が向上する。さらに、レジスト部材４間に適宜な部材８が充填され、表面が平坦になるため、それだけ光の拡散が抑制され、解像度及びコントラストが向上することになる。

【００２６】

具体的には支持材，ＵＶ接着剤，ＴＡＣフィルム，ＰＶＡフィルムをこの順で積層した部材に、家電部材一般湿熱試験（条件；４０°Ｃ×９５％ＲＨ）を行ったところ、支持部材とＵＶ接着剤との界面，ＵＶ接着剤とＴＡＣフィルムとの界面及びＴＡＣフィルムとＰＶＡフィルムとの界面，いずれか一つの界面で２４時間以内に剥離が発生したが、本実施例においては、上記条件で５００時間以内でも剥離等の外観異常は生じないことを確認している。

【００２７】

尚、上記製造においては各部材をロール状とすれば連続製造が可能となり、一層、３Ｄ映像表示体の量産性が向上することとなる。

【００２８】

このようにして製造した３Ｄ映像表示体からの映像を右目用映像表示部ａからの右目用映像のみを透過する偏光板付右目用レンズと左目用映像表示部ｂからの左目用映像（右目用映像を構成する光の振動方向に対し９０°直交する方向に振動する光により構成された映像）のみを透過する偏光板付左目用レンズとから成る偏光メガネで見ると、観察者は該映像を立体映像として観念し得ることになる。

【図面の簡単な説明】

【図１】

従来からある３Ｄ映像装置の説明図である。

【図２】

本実施例の構成説明図である。

【符号の説明】

１　支持材

２　接着剤

３　積層位相差フィルム

４　レジスト部材

５　表示部材

６　ＴＡＣフィルム

７　ＰＶＡフィルム

8　適宜な部材

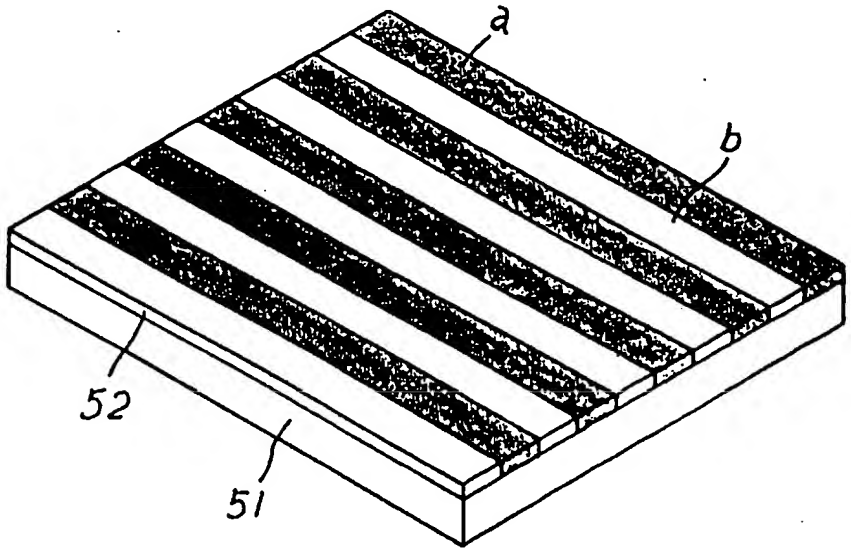
9　保護部材

a　右目用映像表示部

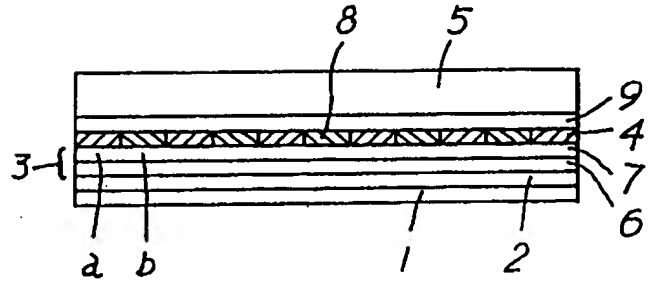
b　左目用映像表示部

【書類名】　　図面

【図１】



【図２】



【書類名】　　要約書

【要約】

【課題】　本発明は右目用映像表示部ａと左目用映像表示部ｂとを有するフィルムを簡易に得ることを目的とする。

【解決手段】　右目用映像表示部ａと左目用映像表示部ｂとが混在した３Ｄ映像を現出させる為の３Ｄ映像表示体の製造方法であって、透明な支持材１上に接着剤２を介して位相差フィルムを設け、続いて、該位相差フィルムの所定位置に透明なレジスト部材４を設けた後、熱水に浸漬させ、乾燥後レジスト部材４側に保護部材９を設け、その後、該保護部材９と表示部材５とを重ね合わせ若しくは貼り合わせる方法である。

【選択図】　　図２

[Document Title] SPECIFICATION

[Title of the Invention]

METHOD FOR MANUFACTURING 3D IMAGE DISPLAY BODY, AND FILM FOR USE IN FORMING 3D IMAGE DISPLAY BODY

[Claims]

[Claim 1] A method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts and left-eye image display parts are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a phase-difference film is disposed on a transparent support with an adhesive agent interposed, [b] transparent resist members are then disposed in specified positions on the aforementioned phase-difference film, [c] [the resulting assembly] is then immersed in hot water and dried, [d] a protective member is then disposed on the side of the resist members, and [e] the aforementioned protective member and a display member are then superimposed or bonded.

[Claim 2] A method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts and left-eye image display parts are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a laminated phase-difference film formed by laminating a TAC film or CAB film, etc., that does not possess birefringence and a drawn PVA film that has a phase-difference function is disposed on a transparent support with an adhesive agent interposed so that the TAC film, etc., is located on the side of the adhesive agent, [b] transparent resist members are then disposed in specified positions on the drawn PVA film, [c] [the resulting assembly] is then immersed in hot water and dried, [d] a protective member is then disposed on the side of the resist members, and [e] the aforementioned protective member and a display member are then superimposed or bonded.

[Claim 3] A method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts and left-eye image display parts are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a laminated phase-difference film formed by laminating a TAC film or CAB film, etc., that does not possess birefringence and a drawn PVA film that has a phase-difference function is disposed on a transparent support with an adhesive agent interposed so that the TAC film, etc., is located on the side of the adhesive agent, [b] resist members are then disposed in specified positions on the drawn PVA film, [c] [the resulting assembly] is then immersed in hot water and dried, [d] the spaces between the resist members are then filled with appropriate members, and a protective member is disposed on the side of these appropriate members and resist members, and [e] the aforementioned protective member and a display member are then superimposed or bonded.

[Claim 4] A 3D image display body manufacturing method which is characterized by the fact that in the 3D image display body manufacturing method claimed in either Claim 2 or Claim 3, members that do not possess birefringence are used as the [above-mentioned] appropriate members and protective member.

[Claim 5] A film for use in forming a 3D image display body which is used to display a 3D image in which right-eye image display parts and left-eye image display parts are mixed, said film for use in forming a 3D image display body being characterized by the fact that [a] a laminated phase-difference film formed by laminating a film that does not possess birefringence, such as a TAC film, etc., and a drawn PVA film that has a phase-difference function is disposed on a transparent support with an adhesive agent interposed so that the film that does not possess birefringence is located on the side of the adhesive agent, [b] right-eye image display parts and left-eye image display parts are disposed in specified positions on this drawn PVA film, [c] transparent resist members are further disposed on this drawn PVA film, and [d] a protective member is disposed on these resist members.

[Claim 6] A film for use in forming a 3D image display body which is characterized by the fact that in the film for use in forming a 3D image display body claimed in Claim 5, the spaces between the resist members are filled with appropriate members.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a method for manufacturing a 3D image display body which is used to display 3D images, and a film for use in forming [such] a 3D image display body.

[0002]

[Prior Art and Problems to Be Solved by the Invention]

3D image display devices such as that disclosed in (for example) USP 5,327,285 have been proposed in the past. In this 3D image display device, as is shown in Figure 1, a film 52 in which right-eye image display parts *a* and left-eye image display parts *b* are alternately disposed side by side is bonded to the surface of a liquid crystal member 51. When the light emitted by the liquid crystal member 51 is controlled so that a specified image is displayed, a right-eye image is displayed from the right-eye image display parts *a*, and a left-eye image is displayed from the left-eye image display parts *b*. Furthermore, since [the device] is constructed so that the direction of vibration of the polarized light constituting the right-eye image from the right-eye image display parts *a* has an angle of 90° relative to the direction of vibration of the polarized light constituting the left-eye image from the left-eye image display parts *b* (i.e., since [the device] is constructed so that (for example) the x component of the right-eye image consisting of two components x and y has a phase difference of 180° (π) with respect to the x component of the left-eye image which similarly consists of two components x and y), the observer can experience the sensation of observing a three-dimensional image when the aforementioned image is viewed using polarizing eyeglasses consisting of a polarizer-equipped right-eye lens that transmits only the right-eye image and a polarizer-equipped left-eye lens that transmits only the left-eye image.

[0003]

In regard to the method used to manufacture the aforementioned film 52 in which right-eye image display parts *a* and left-eye image display parts *b* are alternately disposed side by side, [such as film 52] has been manufactured in the past by a method in which a polarizing film formed by laminating a TAC film and an iodine-treated drawn PVA film is coated with a photoresist, specified portions [of this coated film] are exposed, and the film is then treated with a potassium hydroxide solution, so that the property that the drawn PVA film possesses of being able to rotate the direction of vibration of light in a specified wavelength region "as is" in a linearly polarized state (phase-difference function) is eliminated, as disclosed in Figure 2 of the aforementioned USP 5,327,285. In this method, however, exposure and treatment with a potassium hydroxide solution must be performed following the application of the photoresist coating, so that this method is extremely troublesome. Several types of methods for manufacturing a film 52 by means of such a chemical treatment, and methods for manufacturing a film 52 by means of a physical treatment, etc., are disclosed in USP 5,327,285; however, all of these manufacturing methods are similarly troublesome.

[0004]

The present invention provides a film in which right-eye image display parts *a* and left-eye image display parts *b* are mixed, and a method for manufacturing the same, which are greatly simplified and superior in terms of productivity.

[0005]

[Means Used to Solve the Above-mentioned Problems]

The gist of the present invention will be described with reference to the attached figures.

[0006]

[The present invention] relates to a method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts *a* and left-eye image display parts *b* are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a phase-difference film is disposed on a transparent support 1 with an adhesive agent 2 interposed, [b] transparent resist members 4 are then disposed in specified positions on the aforementioned phase-difference film, [c] [the resulting assembly] is then immersed in hot water and dried, [d] a protective member 9 is then disposed on the side of the resist members 4, and [e] the aforementioned protective member 9 and a display member 5 are then superimposed or bonded.

[0007]

Furthermore, [the present invention also] relates to a method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts *a*

and left-eye image display parts *b* are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a laminated phase-difference film 3 formed by laminating a TAC film 6 or CAB film, etc., that does not possess birefringence and a drawn PVA film 7 that has a phase-difference function is disposed on a transparent support 1 with an adhesive agent 2 interposed so that the TAC film 6, etc., is located on the side of the adhesive agent 2, [b] transparent resist members 4 are then disposed in specified positions on the drawn PVA film 7, [c] [the resulting assembly] is then immersed in hot water and dried, [d] a protective member 9 is then disposed on the side of the resist members 4, and [e] the aforementioned protective member 9 and a display member 5 are then superimposed or bonded.

[0008]

Furthermore, [the present invention also] relates to a method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts *a* and left-eye image display parts *b* are mixed, said 3D image display body manufacturing method being characterized by the fact that [a] a laminated phase-difference film 3 formed by laminating a TAC film 6 or CAB film, etc., that does not possess birefringence and a drawn PVA film 7 that has a phase-difference function is disposed on a transparent support 1 with an adhesive agent 2 interposed so that the TAC film 6, etc., is located on the side of the adhesive agent 2, [b] resist members 4 are then disposed in specified positions on the drawn PVA film 7, [c] [the resulting assembly] is then immersed in hot water and dried, [d] the spaces between the resist members 4 are then filled with appropriate members 8, and a protective member 9 is disposed on the side of these appropriate members 8 and resist members 4, and [e] the aforementioned protective member 9 and a display member 5 are then superimposed or bonded.

[0009]

Furthermore, [the present invention also] relates to a 3D image display body manufacturing method which is characterized by the fact that in the 3D image display body manufacturing method claimed in either Claim 2 or Claim 3, members that do not possess birefringence are used as the [above-mentioned] appropriate members 8 and protective member 9.

[0010]

Furthermore, [the present invention also] relates to a film for use in forming a 3D image display body which is used to display a 3D image in which right-eye image display parts *a* and left-eye image display parts *b* are mixed, said film for use in forming a 3D image display body being characterized by the fact that [a] a laminated phase-difference film 3 formed by laminating a film that does not possess birefringence, such as a TAC film 6, etc., and a drawn PVA film 7 that has a phase-difference function is disposed on a transparent support 1 with an adhesive agent 2 interposed so that the film that does not possess birefringence is located on the side of the adhesive agent 2, [b] right-eye image display parts *a* and left-eye image display parts *b* are disposed in specified positions on this drawn PVA film 7, [c] transparent resist members 4 are further disposed on this drawn PVA film 7, and [d] a protective member 9 is disposed on these resist members 4.

[0011]

Furthermore, [the present invention also] relates to a film for use in forming a 3D image display body which is characterized by the fact that in the film for use in forming a 3D image display body claimed in Claim 5, the spaces between the resist members 4 are filled with appropriate members 8.

[0012]

[Operation and Effect of the Invention]

When [the above-mentioned assembly] is immersed in hot water after the transparent resist members 4 have been disposed in specified positions on the phase-difference film, water permeates the portions of the phase-difference film where no resist members 4 are present, so that these portions show a change in properties. As a result, the property of being able to rotate the direction of vibration of light in a specified wavelength region "as is" in a linearly polarized state (phase-difference function) is lost only in the above-mentioned portions [of the film], thus producing a film in which the phase of the transmitted light is shifted 180° between portions where resist members 4 are present and portions where no resist members 4 are present.

[0013]

Accordingly, a film in which right-eye image display parts *a* and left-eye image display parts *b* are mixed can be mass-produced by the simple operation of immersion in hot water.

[0014]

In the present invention, since hot water is caused to permeate into specified portions of the phase-difference film, there is a danger that these portions may show local swelling, elution or the appearance of recessed and protruding interfaces, etc. In this regard, however, a protective member 9 is installed in the present invention; accordingly, the resistance of the display body as a whole to moist heat is improved, and the problem of swelling, etc., of the aforementioned phase-difference film is solved. Consequently, the reliability [of the display body] is correspondingly improved.

[0015]

Furthermore, since the spaces between the resist members 4 are filled with appropriate members 8, the surface is flattened; accordingly, the diffusion of light is correspondingly suppressed, so that the resolution and contrast are improved.

[0016]

[Working Configurations of the Invention]

Figure 2 illustrates an embodiment of the present invention, which will be described in detail below.

[0015]

A laminated phase-difference film 3 formed by laminating a TAC film 6 (thickness: 126 μm) and a uniaxially drawn PVA film 7 (thickness: 38 μm) as a phase-difference film (1/2-wave plate) which has a phase-difference function is disposed on the surface of a transparent support 1 (e.g., a glass plate or cellulose acetate butyrate (CAB) plate, etc., with a thickness of about 2 mm) with an adhesive agent 2 (e.g., an ultraviolet-curable resin) interposed, and the ultraviolet-curable resin is cured by means of ultraviolet light. Furthermore, a glass plate that does not possess birefringence is most desirable as the support 1. Moreover, besides a film formed by laminating a TAC film 6 with a drawn PVA film 7, the laminated phase-difference film 3 may also be a film formed by laminating a CAB film with a drawn PVA film 7; in short, any film formed by laminating a film that does not possess birefringence with a drawn PVA film 7 may be used as the laminated phase-difference film 3.

[0018]

Next, a transparent resist ink which has a high water resistance and high adhesion (e.g., a urethane resin type adhesive agent) is applied by screen printing as resist members 4 in specified positions on the above-mentioned uniaxially drawn PVA film 7. The resist ink in this case is [applied in the form of] linear bodies with a width of 160 μm, which are applied to the surface of the drawn PVA film 7 from one side to the other. These linear bodies are disposed side by side at a pitch of 160 μm.

[0019]

Furthermore, it is not necessary that the resist ink have a uniform width and uniform pitch as described above. Moreover, [the ink] need not be [applied in the form of] linear bodies; it would also be possible, for example, to dispose square bodies (as seen in a plan view) in a staggered arrangement.

[0020]

Next, this [assembly] is immersed for approximately 30 seconds in hot water at a temperature of 80°C (of course, the peripheral surfaces are subjected to an appropriate waterproofing treatment), so that the orientation of the molecules in the drawn PVA film 7 is destroyed by allowing water to permeate into the portions where no resist ink is present, thus eliminating the aforementioned phase-difference function that was present in the state prior to drawing, i.e., [the phase-difference function] that is intrinsically possessed by the drawn PVA film 7. [In this way,] the portions where the resist ink is present are converted into (for example) right-eye image display parts *a*, and the portions where no resist ink is present are converted into left-eye image display parts *b*. As a result of various experiments, it has been confirmed that the properties of the above-mentioned drawn PVA film 7 are similarly lost if the film is immersed for 5 seconds to 10 minutes in hot water at a temperature of 80°C to 100°C.

[0021]

Then, a UV resin, PVA-type adhesive agent or acrylic-type tacky adhesive agent, etc., is applied to the surface of the drawn PVA film 7 as appropriate members 8 in the spaces between the resist ink. Furthermore, a TAC or CAB sheet is laminated as a protective member 9. Moreover, the appropriate members 8 and protective member 9 may be any members that do not possess birefringence, so that there is no change in phase.

[0022]

Then, a 3D image display body is formed by superimposing [the above-mentioned assembly] by means of a magnet, etc., on a display member 5 which has a liquid crystal disposed inside, or bonding [the above-mentioned assembly] to such a display member 5 by means of an appropriate adhesive agent.

[0023]

The positions where the resist ink is applied, i.e., the positions of the right-eye image display parts *a* and left-eye image display parts *b*, are set so that they coincide with the pitch of the liquid crystal cells of the display member 5 that is bonded.

[0024]

A film in which right-eye image display parts *a* and left-eye image display parts *b* are disposed side by side can easily be obtained by means of the above manufacturing method; accordingly, a 3D image display body can also easily be obtained.

[0025]

Generally, PVA has a poor resistance to moist heat. Furthermore, in the present embodiment, hot water is caused to permeate specified portions of the drawn PVA film 7; accordingly, there is a danger that that these portions may show local swelling, elution or the appearance of recessed and protruding interfaces, etc. In this regard, however, a protective member 9 is installed in the present embodiment; accordingly, the resistance of the display body as a whole to moist heat is improved, and the problem of swelling, etc., of the aforementioned phase-difference film 7 is solved. Consequently, the reliability [of the display body] is correspondingly improved. Furthermore, since the spaces between the resist members 4 are filled with appropriate members 8, the surface is flattened; accordingly, the diffusion of light is correspondingly suppressed, so that the resolution and contrast are improved.

[0026]

In concrete terms, when a member formed by laminating a support, a UV adhesive agent, a TAC film and a PVA film in that order was subjected to a general moist heat test for household electrical materials (conditions: 40°C × 95% RH), peeling occurred within 24 hours at one of the

interfaces, i.e., the interface between the support member and the UV adhesive agent, the interface between the UV adhesive agent and the TAC film, or the interface between the TAC film and the PVA film. In the case of the present embodiment, however, it was confirmed that no abnormalities in external appearance such as peeling, etc., occurred in 500 hours under the above-mentioned conditions.

[0027]

Furthermore, if the respective members are provided in the form of rolls in the above-mentioned manufacturing [process], continuous manufacture is possible, so that the productivity of the 3D image display body is improved even further.

[0028]

When the image from the 3D image display body manufactured as described above is viewed through polarizing eyeglasses consisting of a polarizer-equipped right-eye lens that transmits only the right-eye image from the right-eye image display parts *a* and a polarizer-equipped left-eye lens that transmits only the left-eye image from the left-eye image display parts *b* (i.e., an image that is composed of light that vibrates in a direction that is 90° perpendicular to the direction of vibration of the light composing the right-eye image), the observer can experience the sensation of viewing the above-mentioned image as a three-dimensional image.

[Brief Description of the Drawings]

[Figure 1] Figure 1 is an explanatory diagram of a conventional 3D image display device.

[Figure 2] Figure 2 is an explanatory diagram of the construction of an embodiment [of the present invention].

[Explanation of Symbols]

1 Support
2 Adhesive agent
3 Laminate phase-difference film
4 Resist members
5 Display member
6 TAC film
7 PVA film
8 Appropriate members
9 Protective member
a Right-eye image display parts
b Left-eye image display parts

[Document Title] Abstract

[Abstract]

[Object] The object [of the present invention] is to allow the easy production of a film that has right-eye image display parts *a* and left-eye image display parts *b*.

[Solution] [The present invention provides] a method for manufacturing a 3D image display body which is used to display 3D images in which right-eye image display parts *a* and left-eye image display parts *b* are mixed, said method [being characterized by the fact that] [a] a phase-difference film is disposed on a transparent support 1 with an adhesive agent 2 interposed, [b] transparent resist members 4 are then disposed in specified positions on the aforementioned phase-difference film, [c] [the resulting assembly] is then immersed in hot water and dried, [d] a protective member 9 is then disposed on the side of the resist members 4, and [e] the aforementioned protective member 9 and a display member 5 are then superimposed or bonded.

[Selected Figures] Figure 2